EDITORIAL ARTICLES.

THE TREATMENT OF ANEURISM BY THE INTRODUCTION OF COAGULANTS.

The case recently reported by Dr. Cayley of an aortic aneurism treated by the introduction into the sac of steel wire again raises for discussion this method of dealing with such aneurisms as cannot be treated by other surgical measures.

Dr. Cayley's patient was a man 48 years of age, who had had symptoms of intra-thoracic aneurism for seven months; these were succeeded by a growth of the tumor up into the neck. In spite of Tufnell's treatment carried out with rigid care, this upward extension of the sac continued and threatened speedy death by external or internal rupture. It was evident that nothing was to be hoped for from either ligature or compression of the branches of the aortic arch. The patient's condition was so urgent that electrolysis did not offer much chance of benefit, and under the circumstances it was determined to repeat the operation which was first of all performed at Middlesex Hospital by the late Mr. C. H. Moore, but with one all-important difference, *to take care that the wire was aseptic.* Accordingly, on June 24, Mr. Hulke introduced into the cervical part of the aneurism about forty feet of fine steel wire. The operation was unattended by accident, and the cervical portion of the tumor became completely consolidated. Subsequently the intra-thoracic portion of the tumor increased and caused dyspnœa and cough, and on September 10, in Mr. Hulke's absence, I repeated the operation and passed nearly thirty-five feet of wire into the sac close above the sternum. The patient died in a paroxysm of dyspnœa on September 19. At the *post-mortem* examination a large aneurism of the ascending part of the arch of the aorta was found; the whole of the upper portion was filled by a clot embedded in which was the wire; the lower portion of the tumor consisting of the dilated aorta had compressed and flattened the trachea, and this caused the patient's death.

This result must be regarded as eminently satisfactory; the patient's life was prolonged for more than two months, and the *post-mortem* examination showed that the saccular portions of the aneurism were filled with clot, and only the tubular dilatation of the aorta was still patent. It is obvious that if the clot had extended into this part and blocked the whole aorta, the effect would have been extremely disastrous. The case is, therefore, doubly valuable, for it illustrates what may and what may not be hoped for from this mode of treatment. It shows that the introduction of iron wire into saccular aneurisms may lead to their obliteration by coagulum, but that fusiform or tubular aneurisms of the aorta resist this as they do other means of cure.

It is the frequent and ever varying association of these two forms of aneurism in the chest that explains the great divergence observed in their course, and in their response to treatment. It must be observed that the consolidation of the saccular parts of these composite aneurisms is of great practical importance for three reasons. It may lessen or remove altogether serious compression of important parts. It removes the danger of rupture of the aneurism, whether externally or internally, and then, in all cases, it lessens the expansile pressure of the blood in the unobliterated part of the aneurism. It is important to bear this in mind, for it is easy to be deceived by the subsequent growth of the aneurism in another direction. The pressure upon the inner wall of an aneurism increases directly with the amount of fluid in the sac, and, therefore, anything which diminishes the bulk of the fluid part of the tumor, lessens the internal pressure upon the entire aneurism. The obliteration of any part of an aneurism is therefore a valuable conservative process, and the failure to occlude the entire tumor does not imply that the treatment has been of no practical value. We have in Moore's operation a powerful means of inducing coagulation within an aneurism. What are its dangers and drawbacks? First of all must be mentioned that which proved fatal in Mr. Moore's case, septic poisoning. No special precautions were employed in the preparation of the iron wire Mr. Moore used, and his patient succumbed to an intense local arteritis and general blood poisoning. This is a very real peril, but one that can be easily avoided. Mr. Hulke soaked his wire in liquor potassæ and so rendered it aseptic, others have used carbolized catgut or horse hair which can be purified by carbolic acid solution 5 per cent.

The second danger is embolism, which may arise in one of two ways, either a portion of clot may be dislodged and washed on by the blood stream, or a part of the substance introduced may itself be carried into an artery beyond. It is this latter possibility which I think should preclude the use of horse hair or catgut, which are in several short lengths and are so flexible that they can readily be whisked along by the blood. The best material to use is one which can be introduced in one continuous piece, and which has a sufficient tendency to curl up within the aneurism to oppose the force of the blood tending to carry it on. Nothing fulfills these conditions better than fine steel wire coiled round a slender cylinder; it can be obtained of any desired length, and when passed into the aneurism, at once curls up within the sac and forms an irregular tangled mass around which the blood speedily coagulates. The third danger is the wound of the vein or other important structure at the time of the operation. This is to be guarded against by a very careful examination of the tumor at the seat of the proposed operation, and by only operating upon parts of the tumor which present externally or are far removed from important structures. This is a consideration that must be kept in view. The last danger is that attending any local interference with the sac of an aneurism, the lighting up of acute inflammation around it. The danger of this necessitates the utmost gentleness and care in all the steps of the operation.

The foregoing considerations indicate in what class of cases this method of treatment may be resorted to. External aneurism, with very few exceptions, are susceptible of treatment by other surgical means, but in aneurism in the buttock and in the foot and in some of those in the groin and neck, Moore's treatment is one that may fairly be employed. In internal aneurisms the special indications for its use are, (1) failure of carefully carried out constitutional means to excite coagulation ; (2) rapid growth of the aneurism with threatened rupture of the sac ; (3) the saccular form of aneurism in whole or in part ; (4) and the superficial position of part of the sac. This last condition was notably wanting in a case of abdominal aneurism (Loretta's) in which a laparotomy was first performed, and the aneurism exposed, and then the wire was introduced. In other words, the cases in which Moore's treatment is suitable, are those for which electrolysis has been advocated.

The operation itself is one of great simplicity. A Southey's canula without lateral holes is the best instrument to use, and care should be taken to have it of such a calibre that the wire to be introduced passes through it without undue friction. Steel wire that has been coiled around a cylinder of not more than one-half inch in diameter, and subsequently rendered aseptic by immersion in liquor potassæ, is the best material to employ. In "feeding" it through the canula care should be taken when uncoiling the wire not to get it into "kinks," as they catch in the canula. The wire should be steadily passed in until a distinct sense of resistance is observed. Having cut the wire at the outer end of the canula, that part of it still lying in the canula is most easily pushed into the aneurism by introducing the *blunt* end of Southey's trocar—this fits the canula exactly and with certainty pushes the wire before it. This little manœuvre is useful, as it is important not have the outer end of the wire projecting through the sac. On withdrawing the canula the puncture in the skin is to be closed with a pledget of lint fixed in place with a strapping or a fine pin and figure of 8 suture. An anæsthetic is not necessary, and in many of the cases calling for this treatment is best dispensed with. The operation may be without any apparent results upon the tumor for two or three days, but after that time the pulsation should become less marked, and the tumor firmer. In addition to the two Middlesex Hospital cases, a similar operation has been performed by Dr. Lewis for subclavian aneurism (horse hair), by Mr. Bryant for popliteal aneurism (horse hair), by Dr. Rubie for innominate aneurism (wire), by Baccelli—two cases, by Von der Meulen, for brachial aneurism (catgut), and by Loretta for abdominal aneurism (wire).

The extreme gravity of the cases in which this treatment would be employed precludes in almost all cases the hope of more than a palliative effect, but in view of their hopeless character, this consideration ought not to prevent a fair trial of a measure which appears to be attended with very little risk, and may prolong life or afford distinct relief. As compared with electrolysis the introduction of steel wire is simpler, requiring no special apparatus, more certain to cause coagulation and probably safer.

A. PEARCE GOULD.

EXCISION OF THE HIP JOINT.

This operation, which, before the beginning of antiseptic surgery, had such a high mortality as to be looked upon with much suspicion, and even condemned by a great number of surgeons, has since that time lost many of its dangers, and there is not now any more any question about the propriety of the operation, but there still exists a wide difference of opinion as to the time, in the course of the disease, most suitable for surgical interference.

It will be necessary to refer, in a brief manner, to the pathological conditions present in these cases, as a careful consideration of them may serve to determine the expediency of surgical interference, and the time when the same should be undertaken. In view of the light which has been thrown upon this subject by recent investigations by Kiener, Paulet, Becker[1] and many others, we are justified in assuming, I think, that the coxitis in children we meet with, is almost invariably of tuberculous origin. The pathological conditions present in these cases are, of course, like those of tuberculous inflammation in other joints. The inflammation may primarily attack the synovial membrane, but more frequently the bones entering into the formation of the joint are first involved.

In synovitis tuberculosa circumscribed, fungous, gray granulations make their appearance, infiltrating the synovialis and causing hypermia and swelling of that membrane.[2] The synovial fluid becomes turbid, and gradually changes into pus; at times the quantity of the fluid is not increased, but more frequently the capsule becomes distended with rapidly accumulating pus. The softened and disorganized membrane, being unable to resist the pressure of the accumulated fluid, ruptures, the pus burrows its way to the periphery and abscesses occur. After the articular cartilages have become destroyed, the bony structure of the joint becomes infected. But more frequently the tuberculous inflammation begins in the bone. The cancellous tissue is, as a rule, first invaded by grayish granulations, which may be encysted for a time, but the bony partitions dividing them rapidly disappear, forming masses which undergo caseous degeneration.[3] The osseous tissue surrounding these foci becomes infiltrated and softened, abscesses in the bony tissue appear, the cancellous spaces become filled with caseous matter and pus, the bone becomes thickened, and necrosis ensues. If the bone be now sawn through, it will be found to be of a dirty white color. At times the osteomyelitis does not extend into the joint, but generally the joint becomes infected. When the entire joint is attacked by this inflammation, the articular cartilages, the ligamentum teres and the synovialis are disorganized and destroyed, the head of the femur will be found to a greater or less extent absorbed and irregular in outline. The acetabulum, in the advanced stages, is not infrequently perforated, and the lateral portions may be entirely destroyed, favoring the slipping of the head of the femur out of the joint, and in this manner, producing at times, spontaneous dislocation of the femur.[4] Not every case pursues this course, for the reason that the spontaneous cure may occur at any stage of this affection.

The clinical phenomena of coxitis have been divided into three stages. In the first stage there is some limping and pain in the affected limb; the second stage is the stage of abduction and outward rotation, the limb is slightly flexed and apparently elongated; in the third stage the extremity is adducted and rotated inwards, the limb is actually shortened and the joint disorganized.

In the earlier stages of coxitis horizontal extension with absolute fixation of the joint will prove most successful, and only after the progress of the disease has been entirely arrested, should patient assume the erect posture, but must wear some apparatus, which will keep the joint at rest.[5] Taylor's or Sayre's apparatus will answer best for this purpose. Abscesses should be freely opened, old sinuses scraped out, and drainage tubes inserted into them. When the presence of dead bone can be determined, the same should be gouged out, and loose sequestra removed. All these minor operations should be performed antiseptically. If, upon the adoption of these measures, the discharges diminish, the caries of the affected bones does not extend, and the general condition of the patient improves, nothing else need be done. From what has already been said in the brief account of the pathological conditions present, it can readily be inferred that there is a certain number of cases, who, in spite of the best mechanical and expectant plan of treatment, grow constantly worse.

When the disease extends, the bones of the joint becomes more and more involved, more sinuses form, and more pus is discharged, the local condition becomes constantly aggravated, and the constitution of of the patient undermined. The most conservative surgeon, I think, will concede that the complete exsection ot all necrosed bone, together with the establishment of thorough drainage, is now called for, that is, if there be not present some constitutional trouble, such as tuberculosis of the lungs, etc., to contra-indicate surgical interference. I have related in the above the usual method of treatment pursued in coxitis, and it is shown that excision is resorted to only after all other means have failed, as a last resort.

What does an operation promise?

1. By removing the source of irritation, it will relieve pain and suffering.

2. For the same reason it will check the suppuration and prolong life.

3. It may arrest the disease.

4. It may secure the patient a useful limb.

5. It may prevent general tuberculous infection.

The four first propositions will be readily conceded as the possible or probable result of the operation, but the fifth one meets with considerable opposition. It is claimed that tuberculosis is still the most common cause of death after the operation, and that hence the same grants no immunity from tuberculous infection. But with as much propriety and reason, it might be urged, that the extirpation of a cancerous tumor is contra-indicated for the reason that most patients succumb to cancerous dissemination, even after the tumor has been extirpated. In the light of recent investigations it would seem reasonable to hold that a tuberculous focus may disseminate and infect the system, and to assume that a complete destruction, extirpation or excision of this focus, whenever this is possible, is a rational procedure.

What are the dangers of the operation?

Mr. Bryant, in his "Practice of Surgery," speaking of the dangers of excision of the hip, says that in these cases the joint, as a joint, has disappeared, and that there seems to be no more danger in an operation, undertaken upon the hip joint, than in any severe operation for necrosed bone.[6] In a general way it may be asserted that the advent of antiseptics into surgery has had a most favorable effect upon the mortality of resection of the hip, that since that time the mortality of the operation per se has been reduced to less than five per cent., and that the greater number of those cases that prove fatal after excision, perish in spite of the operation, that is, as a result and extension of the disease. The dangers of the operation in children have, therefore, been reduced to a minimum. This will naturally suggest the question if excision of the hip has ceased to be a very serious operation, are we justified in postponing the same till the disease has caused so much destruction and mischief as to preclude the possibility or probability that the patient will make a good recovery after the same is undertaken, or, in other words, does early surgical interference offer better results than the expectant plan of treatment.

Dr. L. M. Yale, of New York, in a paper on excision of the hip in the ANNALS OF SURGERY for January, 1886, has collected statistical reports upon this subject, and these differ widely as to the relative merit of early surgical interference and the usual expectant plan of treatment, The following statistics by Grosch, however, which I have taken from the paper of Dr. Yale, on 166 cases, treated antiseptically, constitute, in my opinion, a powerful plea for early surgical interference. Dr. G.

divides his cases into three classes. The first class contains those operated upon while there were but slight changes in the joint; the second, cases with suppuration, abscesses and fistulæ; and the third, cases with complete destruction of the joint, extensive necrosis of bone, and great debility. In the first class there were four children no mortality; for the second, the mortality was 24.1 per cent., and for the third, 67.5 per cent. Billroth, Koenig, Sayre, Hueter and others, all favor early operations. The latter says: "I hold that resection of the hip joint in coxitis to be indicated as soon as extensive suppuration of the joint manifests itself, or as soon as the course of the disease shows that the termination in suppuration can no longer be prevented," and he adds, that in his opinion, not more than 50 per cent. of those cases heal spontaneously, that reach the second floresence stage."[7]

Dr. G. A. Wright,[8] Manchester, from an extensive experience, arrives at the conclusion that in every case where there is suppuration of the joint and thickening of the trochanter, excision ought to be performed; where once this chronic osteomyelitis is established, nothing short of excision can prevent the ultimate progress of the disease." Mr. George Cowell[9] thinks the operation should performed without loss of time in cases of profuse suppuration and failure of health." Prof. Eugene Boeckel[10] hold that "early resection is the surest method of curing quickly and well a case of suppurative coxitis;" Dr. William Alexander[11] suggests that "the joint should be excised as soon as a decided second stage of hip disease has been reached;" Mr. Gant, in his Lettsomian Lectures, states "whenever the health is failing, whatever stage the joint is in, excise."[12] All these eminent authorities evidently favor early resection.

To recapitulate, the reasons which might be urged in favor of early excision of the hip joint in the coxitis of children, are the following:

1. The mortality of early operations is almost nihil; the death rate increases pari passu with the extension and duration of the disease.

2. Early resection arrests the course of the coxitis, and effects a more rapid cure than the rest and mechanical treatment.

3. The results as regards the usefulness of the extremity are better after early excision than after the expectant plan of treatment.

4. There is reason to suppose that early operative interference may prevent general tubercular dissemination.

The time most suitable for excision has arrived when suppuration exists and persists in spite of rest, mechanical and hygienic treatment; when fever exists, which may he explained by the presence of fetid pus; as soon as the general health of the patient begins to fail.

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